REMARKS

Claims 22, 24-26 and 45 are amended. Claims 10, 21, 23, 27-44 and 46-51 are cancelled. Claims 22, 24-26 and 45 are in the application for consideration.

By the filing of this Response, no admission is made as to the propriety of the Examiner's last action, nor is there an admission that all of the references cited by the Examiner are prior art.

Claim 25 previously stood rejected as being anticipated by U.S. Patent No. 5,874,351 to Hu et al., owned by Applicant. Claim 25 has been rewritten in independent form to emphasize that the claimed annealing occurs with the compressive stress inducing atoms within the first phase refractory metal silicide of the first crystalline phase. Claim 25 is further amended to recite that the compressive stress inducing atoms comprise Ge. The cited Hu et al. patent does not disclose utilization of germanium in the manner claimed by Applicant. Therefore, claim 25 as amended is not rejectable under 35 U.S.C. §102(e) under the Hu et al. patent. Accordingly, claim 25 should be allowed.

Claims 22, 24 and 26 are rewritten in independent form, and otherwise emphasized to recite that the subject annealing is done with the compressive stress inducing atoms within the first phase refractory metal silicide of the first crystalline phase. Claims 22, 24 and 26 were rejected under 35 U.S.C. §103. This RCE filing is subsequent to November 29, 1999. Therefore, the Hu et al. reference is no longer prior art citable in a §103 rejection, pursuant to the

amendments to 35 U.S.C. § 102(c). Accordingly, the Examiner's rejections in this regard must be withdrawn, and action to that end is requested.

Claim 45 stands previously rejected as being anticipated by the Japanese reference to Kawamura et al. Claim 45 has been rewritten in independent form to recite that the refractory metal is formed on a first side of a silicon containing substrate, with the compressive stress inducing material also being formed on that same first substrate side. Claim 45 thereby further recites the provision of such stress inducing material under the first crystalline phase refractory metal silicide on the first substrate side. The cited Kawamura et al. reference is understood to only everywhere disclose the provision of its stress inducing material on the back side of the substrate, and not on the front or first side, as Applicant now positively recites in claim 45. Accordingly, claim 45 as amended is allowable over the Kawamura et al. reference.

This application is believed to be in immediate condition for allowance, and action to that end is requested. If the Examiner's next anticipated action is to be anything other than a Notice of Allowance, the undersigned respectfully requests a telephone interview prior to issuance of any such subsequent action.

Respectfully submitted,

Dated: 3-22-01

By: _____
Mark S. Matkin
Reg. No. 32,268

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No. 09/233,377
Filing Date . . . . . January 18, 1999
Inventor . . . . . Gurtej S. Sandhu et al.
Assignee . . . . . Micron Technology, Inc.
Group Art Unit 2813
Examiner . . . . . T. Pham
Attorney's Docket No. MI22-1114
Title: Method of Forming a Refractory Metal Silicide (as Amended)

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING RESPONSE TO JANUARY 19, 2001 OFFICE ACTION

In the Claims

The claims have been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

Cancel claims 10 and 21.

22. (Amended) ~~The method of claim 21~~ A method of forming a refractory metal silicide comprising:

forming a refractory metal silicide of a first crystalline phase;

providing compressive stress inducing atoms within the refractory metal silicide of the first crystalline phase, the compressive stress inducing atoms being larger than silicon atoms of the silicide;

with the compressive stress inducing atoms within the first phase refractory metal silicide of the first crystalline phase, annealing the refractory metal silicide of the first crystalline phase under conditions effective to transform said silicide to a more dense second crystalline phase; and

wherein the refractory metal silicide comprises $TiSi_x$, and the first crystalline phase is C49 and the second crystalline phase is C54.

Cancel claim 23.

24. (Amended) ~~The method of claim 21~~ A method of forming a refractory metal silicide comprising:

forming a refractory metal silicide of a first crystalline phase;

providing compressive stress inducing atoms within the refractory metal silicide of the first crystalline phase, the compressive stress inducing atoms being larger than silicon atoms of the silicide;

with the compressive stress inducing atoms within the first phase refractory metal silicide of the first crystalline phase, annealing the refractory metal silicide of the first crystalline phase under conditions effective to transform said silicide to a more dense second crystalline phase; and

further comprising *in situ* providing the compressive stress inducing atoms into a refractory metal layer during deposition of said refractory metal layer over an underlying silicon containing substrate; and

annealing the refractory metal layer to form said refractory metal silicide of the first crystalline phase from the refractory metal and silicon of the underlying substrate.

25. (Amended) ~~The method of claim 21~~ A method of forming a refractory metal silicide comprising:

forming a refractory metal silicide of a first crystalline phase;

providing compressive stress inducing atoms within the refractory metal silicide of the first crystalline phase, the compressive stress inducing atoms being larger than silicon atoms of the silicide;

with the compressive stress inducing atoms within the first phase refractory metal silicide of the first crystalline phase, annealing the refractory metal silicide of the first crystalline phase under conditions effective to transform said silicide to a more dense second crystalline phase; and

wherein the compressive stress inducing atoms ~~are selected from the group consisting of~~ comprise Ge~~, W and Co, or mixtures thereof~~.

26. (Amended) ~~The method of claim 21~~ A method of forming a refractory metal silicide comprising:

forming a refractory metal silicide of a first crystalline phase;

providing compressive stress inducing atoms within the refractory metal silicide of the first crystalline phase, the compressive stress inducing atoms being larger than silicon atoms of the silicide;

with the compressive stress inducing atoms within the first phase refractory metal silicide of the first crystalline phase, annealing the refractory metal silicide of the first crystalline phase under conditions effective to transform said silicide to a more dense second crystalline phase; and

comprising providing the atoms to a concentration within the refractory metal silicide from 10^{16} - 10^{22} atoms/cm^3.

Cancel claims 27-44.

45. (Amended) ~~The method of claim 40~~ A method of forming a refractory metal silicide comprising:

forming a refractory metal on a first side of a silicon containing substrate;

providing a compressive stress inducing material proximate the refractory metal;

after providing the compressive stress inducing material, annealing the refractory metal to form a refractory metal silicide of a first crystalline phase from the refractory metal and silicon of the underlying substrate;

annealing the refractory metal silicide of the first crystalline phase to transform the first phase silicide to a more dense second crystalline phase; and

comprising providing the compressive stress inducing material under the first crystalline phase refractory metal silicide.

Cancel claims 46-51.